DRAFT ACTION PLAN C
For consideration by EBMWG at August 10, 2004 meeting

Overview

The sustainable use action plan is designed to protect sanctuary resources through existing best management practices. This plan focuses on sustainable use with an emphasis on maintaining the national benefits that are produced in the waters of Stellwagen Bank NMS.

Stellwagen Bank is part of the Gulf of Maine ecosystem. Oceanographic conditions in the Gulf of Maine region are influenced by inputs of cold, low-salinity Scotian Shelf water and warm high-salinity slope water (Fig 1). The relative strength of these two primary inputs is dynamic and is influenced by low-frequency changes in the North Atlantic Oscillation (Fig. 2). Changing environmental conditions alter abiotic and biotic processes and make it challenging to discern between human and environmental impacts on the ecological integrity of Sanctuary resources. Complex interrelationships among abiotic and biotic processes along with changing environmental conditions also make it difficult to precisely define what the term "ecological integrity" means (Fig 3). For this reason, a primary focus of the sustainable use plan is to improve monitoring of both biological and environmental parameters within the Sanctuary.

Figure 1. Shallow (<75 m) and deep (>150 m) currents in the Gulf of Maine (Figure courtesy of Dr. David Mountain, Northeast Fisheries Science Center [NEFSC]).

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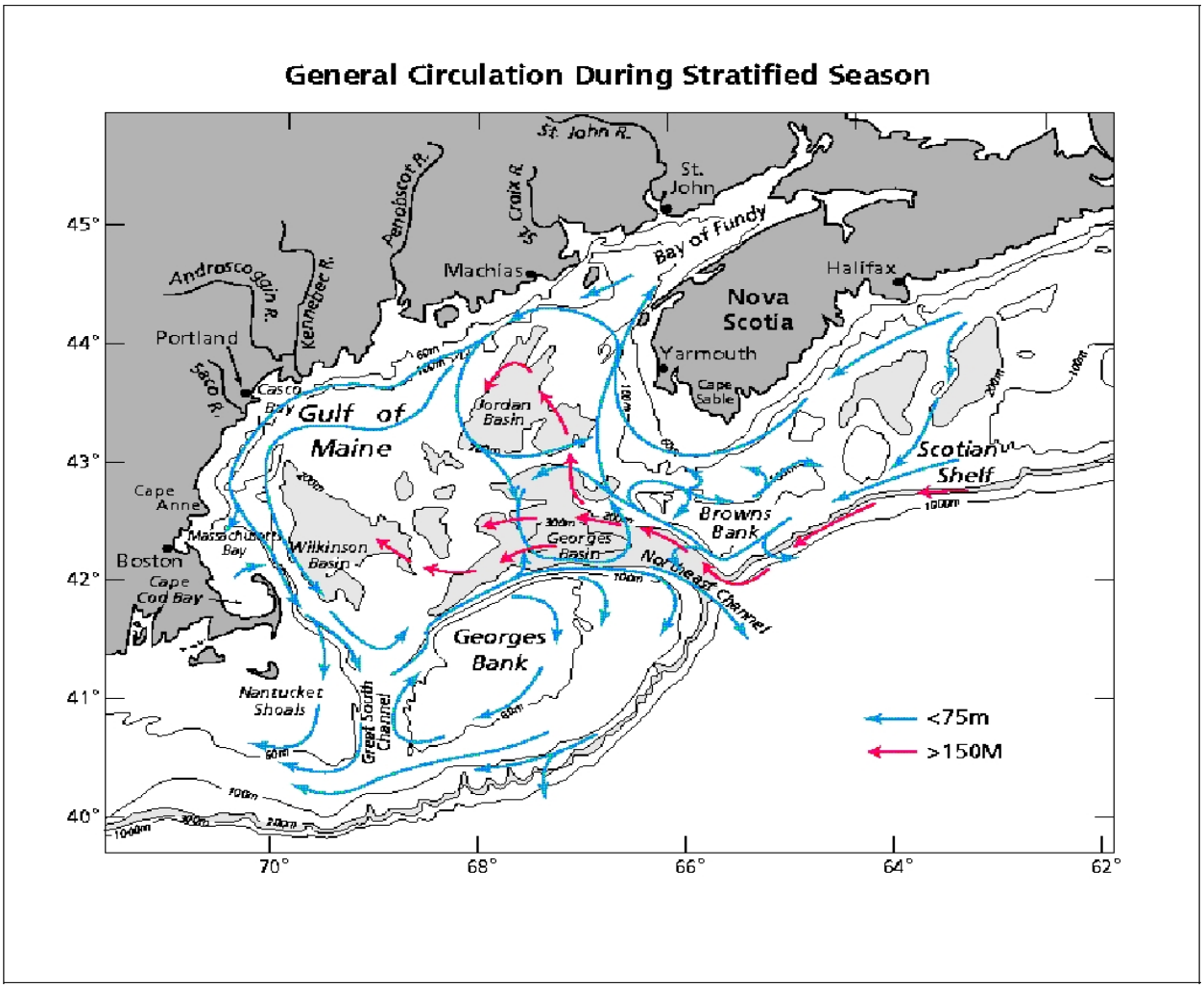


Figure 2. Low-frequency changes in the NAO.

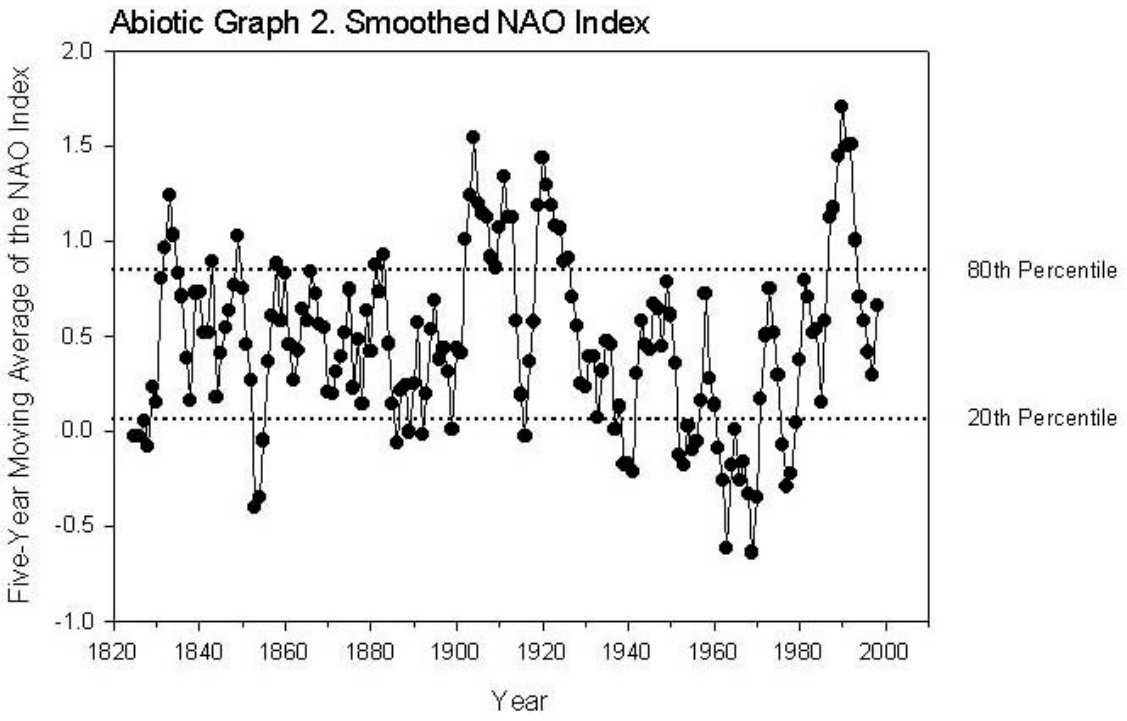
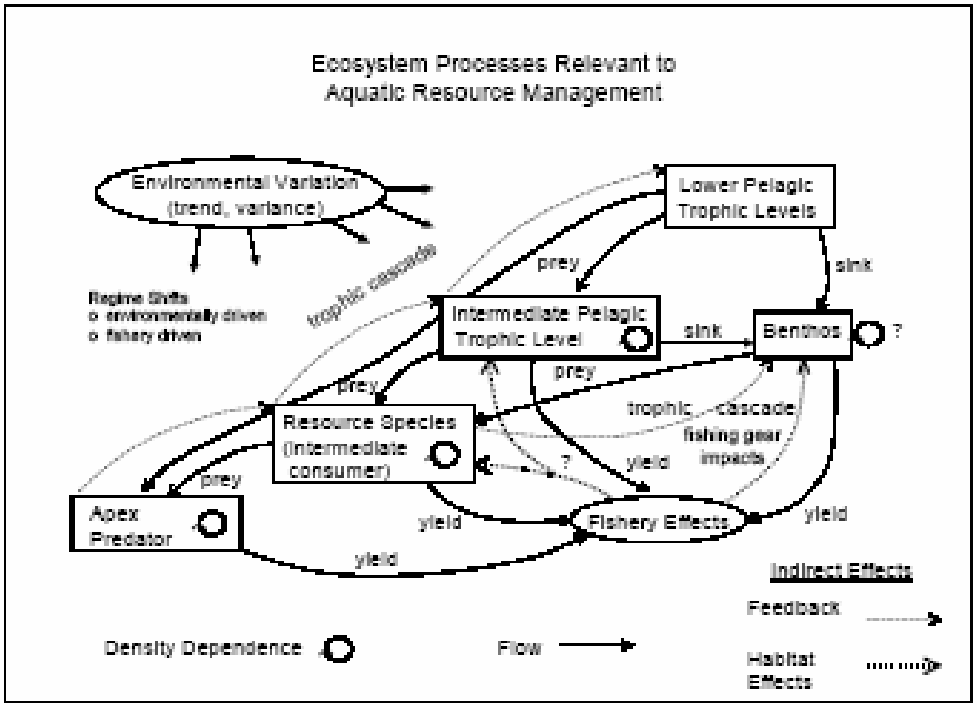


Figure 3. Complex interrelationships between abiotic and biotic processes in aquatic ecosystems (Figure courtesy of Dr. Steve Murawski, NEFSC).



In order to strengthen monitoring of biological and physical oceanographic factors,

collaborative scientific partnerships with local user and industry groups should be cultivated. For example, the Fishermen's Initiative for Scientific Habitat and Ecosystem Research (FISHER Initiative) is working to establish a foundation for an ecological understanding of the marine environment in and around Stellwagen Bank and the Massachusetts Bay area. The ultimate goal of this endeavor is to coalesce fishermen's and scientist's empirical and technical knowledge into a legitimate, credible, and durable scientific foundation that promotes an ecosystem-based approach to fisheries management. Initiative partners currently include the Stellwagen Bank National Marine Sanctuary, Harvard University, University of New Hampshire, Massachusetts Institute of Technology's Sea Grant College Program, Boston University's Marine Program, Tufts University, the Massachusetts Division of Marine Fisheries, the Center for Coastal Studies, and numerous commercial fishermen. Fostering such collaborative partnerships will directly improve the quality of information needed for ecosystem-based management.

On May 1st 2004 Amendment 13 to the Northeast Multispecies Fishery Management Plan (http://www.nefsc.noaa.gov/groundfish/) went into effect. This comprehensive plan includes provisions to rebuild depleted groundfish fishery resources and to protect essential fish habitat (Fig. 10 from Amendment 13). Provisions of the plan include reductions in fishing vessel allocations of days-at-sea, establishment of permanent essential fish habitat closed areas, continuation of existing rolling closures, and reductions in bycatch due to improved gear selectivity. Amendment 13 will directly increase the protection of the ecological integrity of Sanctuary resources by substantially reducing fishery-related effects (Fig. 3). In particular, the New England Fishery Management Council's (NEFMC) omnibus essential fish habitat management plan is expected to help to preserve biodiversity and to ensure the long-term sustainability of Sanctuary resources.

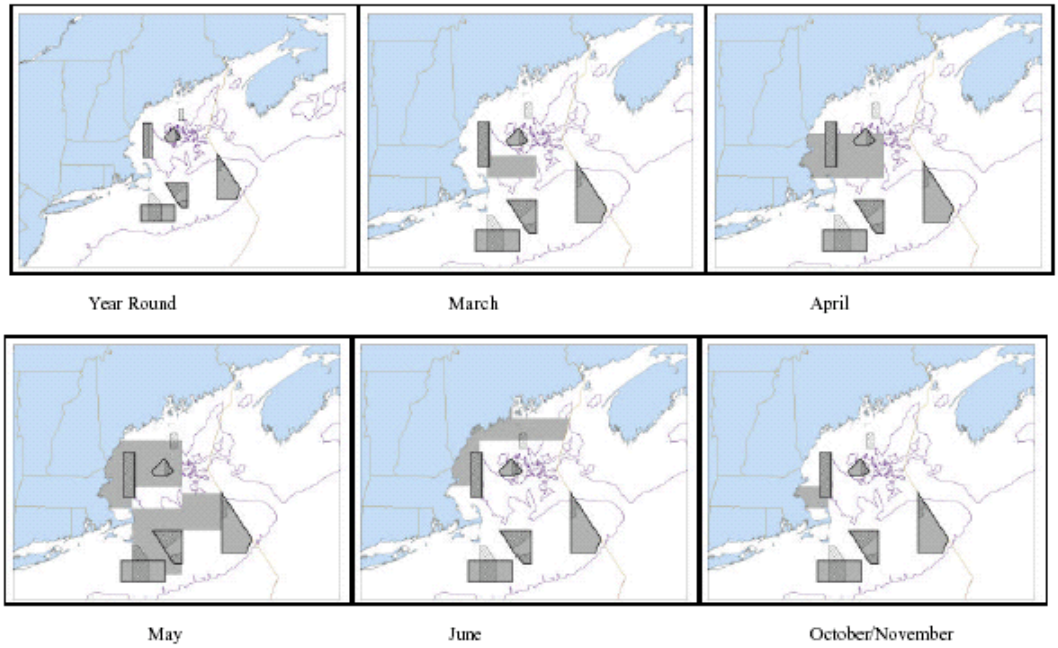


Figure 10 – Proposed action year round and seasonal closed areas. Level 3 habitat areas are cross hatched.

Description of the Issues
[Insert Descriptive Text Here]

Issue Statement
[Insert Descriptive Text Here]

Goal
Barrett, Casoni, DePersia, and Pierce reached consensus on the following overall goal. The overall goal was then translated into a set of distinct operational objectives along with potential management actions and performance metrics.

Recognizing (i) the Sanctuary's uniqueness is substantially due to its importance as a coastal fishing ground; (ii) Sanctuary bottom and water column habitats are impacted to varying degrees by human activities such as waste disposal, commercial fishing, shipping, cruise ships and cable laying in the southwestern Gulf of Maine; (iii) fisheries management, conservation and habitat protection in the Gulf of Maine , including the Sanctuary, are the responsibility of the New England Fisheries Management Council (NEMFC), acting under the authority of the Sustainable Fisheries Act, and coastal states; and (iv) the Sanctuary is not a closed system but is part of the dynamic Gulf of Maine ecosystem, the goal of the Sustainable Use Action Plan is to:

1. Continue region-wide support for management, collaborative research, acquisition of fisheries-dependent information, and exploitation policies and initiatives leading to:
    a. an understanding of and improved protection to the Sanctuary's ecological integrity;
    b. knowledge about the extent to which natural and human factors inside and outside the Sanctuary affect that integrity;
    c. an improved understanding of socioeconomic impacts of measures required to protect that integrity.
2. Maintain existing Sanctuary fishing activities consistent with NEFMC management plans and their requirements for sustainable fisheries, habitat protection and bycatch reduction.
3. Strive for biological successes (e.g., increased fish abundance and diversity as well as improved habitat) while avoiding social failures (e.g., alienation of users, disruption of the historic fabric of fishing communities, loss of or inadequate sharing of socioeconomic benefits and inadequate conflict resolution).

Objectives
[Insert Descriptive Text Here]

Addressing the Issues – Strategies For This Action Plan

STRATEGY EBM.1 - PROTECT ECOLOGICAL INTEGRITY
[Insert Descriptive Text Here]

Activities designated for this strategy include:

1.a Maintain optimum fishery yields. Maintain optimum fishery yields at target fishing mortality rate through use of closed areas, trip limits, days-at-sea restrictions, and other measures. See example below:

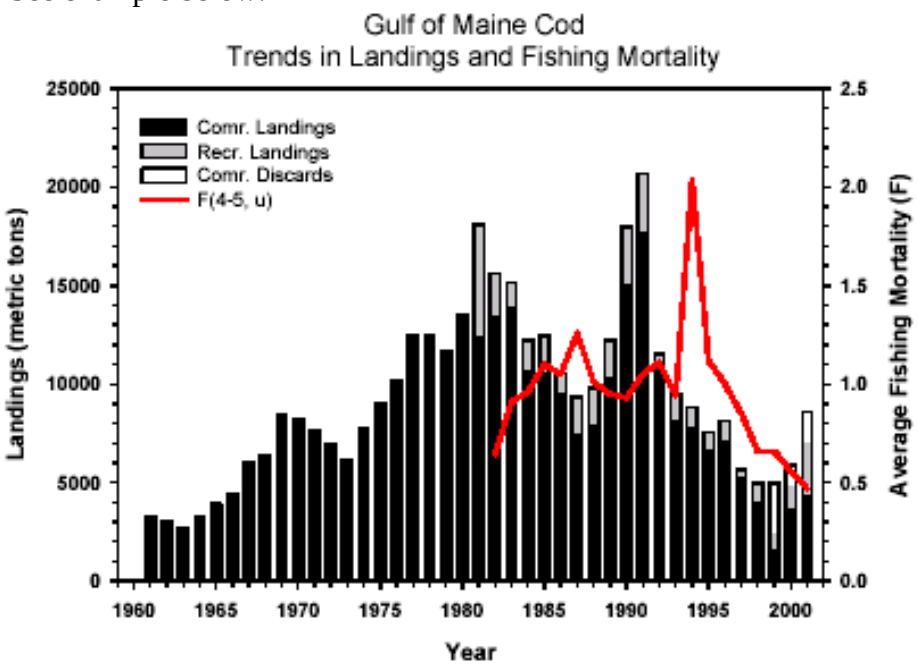


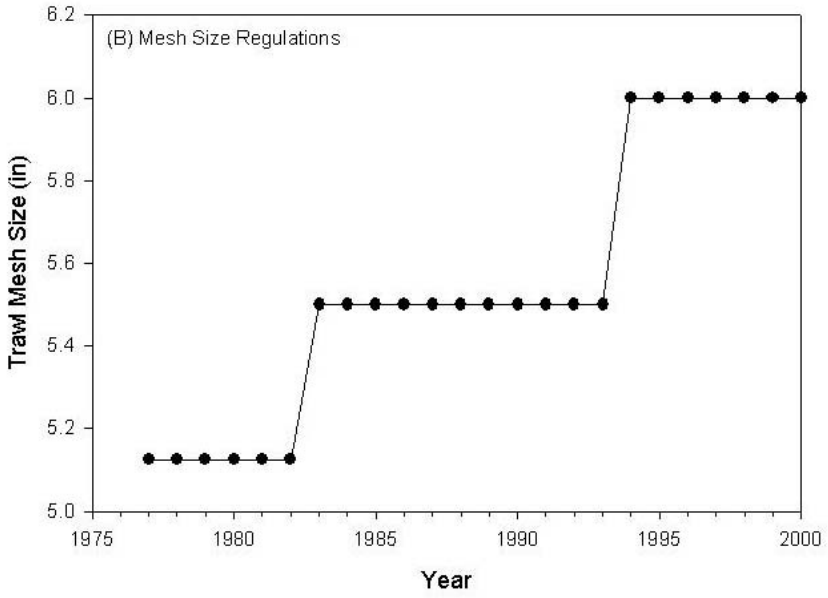
Figure F3. Trends in landings and fishing mortality for Gulf of Maine cod.

1.b Protect essential fish habitat. Conduct FISHER Initiative project to investigate the impacts of storm and tidal events on sand lance habitat and the physical oceanography of Massachusetts Bay.

1.c Reduce bycatch. [Insert Descriptive Text Here]

Strategy Performance measure:

1. Monitor yield (target yield = 16,100 mt) and fishing mortality (target F=0.23) on Gulf of Maine cod and other stocks.
2. Monitor fraction of Sanctuary's area closed to all mobile fishing gear year-round (e.g., the "sliver" of the Sanctuary that lies within the western Gulf of Maine habitat closed area established in Amendment 13) and monitor monthly fraction of Sanctuary's area subject to rolling closures.
3. Monitor minimum trawl mesh and use at-sea observers to measure bycatch rates and discards of target and non-target species. See example below:



STRATEGY EBM.2 - IMPROVE KNOWLEDGE OF STELLWAGEN BANK'S COMMERCIAL AND RECREATIONAL FISHERIES
[Insert Descriptive Text Here]

Activities designated for this strategy include:

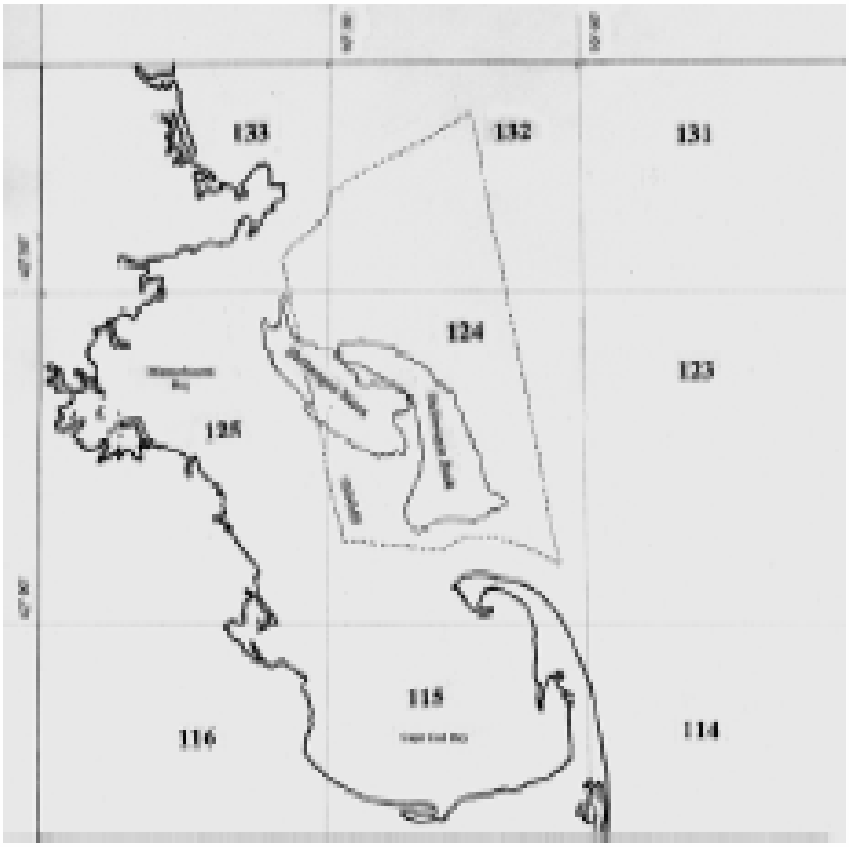
2.a Increase fishery observer coverage, catch sampling at ports, and recreational interview coverage. [Insert Descriptive Text Here]

2.b Use existing VTR database to extract all available data on fishing activities by 30 minute blocks. [Insert Descriptive Text Here]

2.c Conduct FISHER Initiative project to chart anecdotal information and oral histories from local fishermen who fish on Stellwagen Bank. [Insert Descriptive Text Here]

Strategy Performance measure:

1. Number of observed trips, samples per landed ton, number of interviews.
2. Time series of landings and effort in blocks 124 and 125. See example below:



STRATEGY EBM.3 - UNDERSTAND ATLANTIC COD MOVEMENTS
[Insert Descriptive Text Here]

3. a Complete ongoing cooperative research program to tag Atlantic cod. [Insert Descriptive Text Here]

Strategy Performance measure:

1. Number of commercial and recreational fishermen who return cod tags, number of tags returned.

STRATEGY EBM.4 - MONITOR ABUNDANCE AND DISTRIBUTION OF JUVENILE COD IN SANCTUARY AND ADJACENT WATERS
[Insert Descriptive Text Here]

4.a Initiate cooperative research survey targeting juvenile cod. [Insert Descriptive Text Here]

Strategy performance measures:

1. Time series of juvenile cod abundance, spatial description of juvenile cod distribution.

STRATEGY EBM.5 - MONITOR ABUNDANCE AND DISTRIBUTION OF SAND EELS IN SANCTUARY AND ADJACENT WATERS
[Insert Descriptive Text Here]

Activities designated for this strategy include:

5.a Initiate cooperative research survey targeting sand eels. [Insert Descriptive Text Here]

5.b Conduct FISHER Initiative project to examine biological processes of sandlance and associated species on Stellwagen Bank. [Insert Descriptive Text Here]

Strategy performance measures:
1. Time series of sand eel abundance, spatial description of sand eel distribution.

EBM.6 - DEVELOP COMPREHENSIVE DESCRIPTION OF SANCTUARY BOTTOM HABITAT.
[Insert Descriptive Text Here]

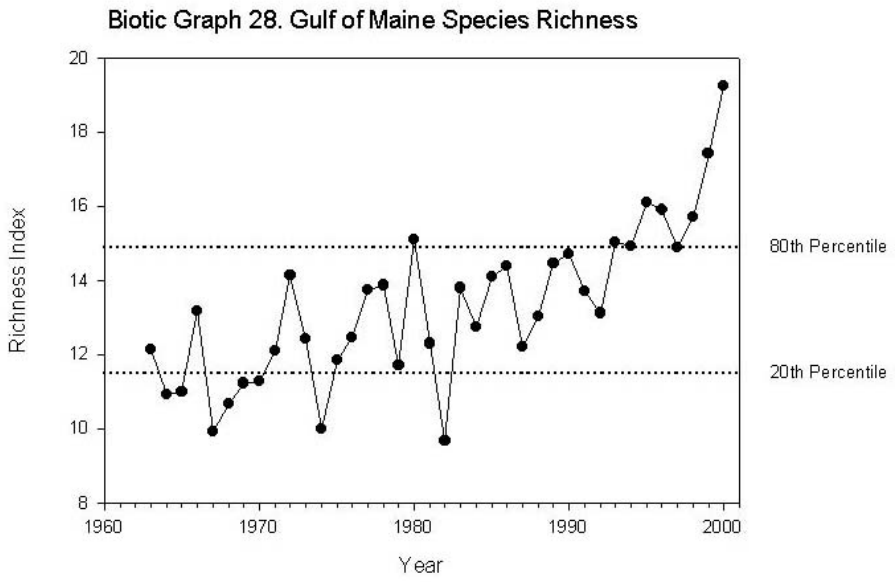
6. a Conduct ROV grab sample and video surveys or use other appropriate survey technologies to characterize habitat. [Insert Descriptive Text Here]

Strategy performance measures:
1. Spatial mapping of habitat types at high resolution.

EBM.7 - DEVELOP APPROPRIATE MEASURES OF BIODIVERSITY WITHIN AND OUTSIDE THE SANCTUARY.
[Insert Descriptive Text Here]

7.a Continue long-term research surveys and develop appropriate analyses. [Insert Descriptive Text Here]

Strategy performance measures:
1. Time series of biodiversity indices. See example below:



EBM.8 - IMPROVE UNDERSTANDING OF THE PHYSICAL AND CHEMICAL OCEANOGRAPHY OF THE SANCTUARY AND THE GULF OF MAINE ECOSYSTEM.
[Insert Descriptive Text Here]

Activities designated for this strategy include:

8.a Provide funding for development of Gulf of Maine ocean observational systems. [Insert Descriptive Text Here]

8.b Conduct FISHER Initiative project to monitor zooplankton in the Gulf of Maine and on Stellwagen Bank. [Insert Descriptive Text Here]

Strategy performance measures:

1. Continuous online data streams for key physical parameters across the Gulf of Maine.

EBM.9 - MONITOR INTERRELATIONSHIPS BETWEEN PREDATORS AND PREY IN THE SANCTUARY AND GULF OF MAINE ECOSYSTEM TO UNDERSTAND WHETHER THE EFFECTS OF CHANGES IN MULTISPECIES ABUNDANCE HAVE CREATED AN IMBALANCE IN THE FOOD WEB.
[Insert Descriptive Text Here]

9.a Continue long-term research surveys and develop appropriate analyses. [Insert Descriptive Text Here]

Strategy performance measures:

1. Time series of prey consumption estimates by important predators, such as elasmobranchs, and in particular, information on whether spiny dogfish have impacted

the abundance of sand eels and other forage species such as Atlantic herring. See example below: